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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Applicant: JEAN-YVES CHENARD ET AL : Group 153

Serial No.: 254,313 : Examiner:  
V. Hoke

Filed: April 15, 1981 :

For: IMPROVEMENT IN THE STABILIZATION  
OF VINYL HALIDE POLYMERS

DECLARATION OF JEAN-CLAUDE MENDELSON -- 37 CFR 1.131

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

I, JEAN-CLAUDE MENDELSON, do hereby declare that:

1. I am the Jean-Claude Mendelson who is an applicant in the above-identified application.
2. Together with Jean-Yves Chenard, I conceived and reduced to practice the broad idea of the generic invention described in French Patent Application No. 78 24863, filed August 29, 1978, whose priority is claimed in the above-identified application.
3. The generic invention of our conception is contained in the claims of our French Patent Application; an English translation of those claims is attached.
4. Our conception of the invention relates to an improvement in the use of metal compounds to stabilize halogen-containing resins; the improvement involves the addition of an ester of a mercapto alcohol and a carboxylic acid.

5. Our conception of the invention as it relates to tin involved organotin compounds broadly; this is seen from claims 4 and 11.
6. Our conception of the invention as it relates to organotin compounds embraced the field of useful organotin stabilizers; it was never our idea that certain types of organotin compounds, such as the halogen-containing organotin compounds, which were in themselves known to be useful stabilizers, were to be excluded from the scope of our conception.
7. Our conception of the scope of our invention included the obvious and well-known halogen-substituted organotin stabilizers; the work done on our behalf by Michel Foure confirmed that our invention was indeed effective when the organotin compound contains halogen.
8. Jean-Yves Chenard and I were fully aware of the work conducted by Michel Foure in the United States in connection with the combination of halogen-containing organotin compounds and mercaptoesters; this work was done in close consultation with us and represents an embodiment of our invention as described in French Patent Application 78 24863 and described and claimed in the above-identified application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section

1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

07 / 26 / 84  
Date

JC Mendel.  
Jean-Claude Mendelsohn

## CLAIMS

1. Improvement in the stabilisation to heat, shock and light of resins containing a halogen, by the addition of one or more metal compounds, which consists in incorporating also into the resin an organic additive having a mercaptan function, characterised in that this additive is an ester of an organic acid, in which the mercaptan function is connected to a carbon atom of the alcohol residue of the ester.

2. Improvement according to claim 1, which consists in incorporating the ester additive containing a mercaptan function in the alcohol residue in the resin stabilised with one or more metal compounds, characterised in that the proportion of the additive is from 0.1 to 5% and preferably 0.5 to 2% by weight of the resin.

3. Improvement according to claim 2, characterised in that the additive, which can be formed by several esters, is added to the resin simultaneously with the one or more metal compounds or separately.

4. Improvement according to any of claims 1 to 3, in which the metal compound is a derivative of tin, antimony, zinc, magnesium or other alkaline earth metal or an alkali metal.

5. Improvement according to any of claims 1 to 4, in which the resin includes an epoxide, a phosphite and/or an anti-oxidant.

6. Stabiliser additive for carrying out the improvement according to any of claims 1 to 5, characterised in that it is of the type  $\text{RCOO-R'SH}$ , where R is an alkyl or alkenyl containing at least two carbon atoms and preferably 8 to 18C, or an aryl or aralkyl, the R group possibly carrying a second carboxylic group or a second group  $-\text{COOR'SH}$ , while R' is a  $\text{C}_1$  to  $\text{C}_{18}$  alkylene which can carry one or more  $-\text{OH}$ .

7. Additive according to claim 6, characterised in that RCOO- is a fatty acid residue, in particular caprylic, perlargonic, capric, undecanoic, lauric, myristic, palmitic or stearic.
8. Additive according to claim 6, characterised in that the group RCOO- derives from an aliphatic diacid, in particular succinic, adipic or dioleic or an aromatic diacid, particularly phthalic.
9. Additive according to any of claims 6 to 8, characterised in that the group -R'SH is derived from a C<sub>2</sub> to C<sub>6</sub> mercapto alkanol, in particular 1-mercapto-ethanol-2, 1-mercapto-propanol-3, 1-mercapto-2-hydroxy-propanol-3 or 1-mercapto-butanol-4.
10. Additive according to claim 9, characterised in that it comprises calcium stearate and mercapto-ethyl stearate.
11. Additive according to claim 9, characterised in that it comprises an organic tin compound and mercapto-ethyl stearate.
12. Additive according to claim 9, characterised in that it comprises antimony tri-mercaptide and mercapto-ethyl stearate.
13. A plastic mass of polyvinyl chloride or of modified polyvinyl chloride, stabilised by the process according to any of claims 1 to 5.

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OF VINYL HALIDE POLYMERS

DECLARATION OF JEAN-YVES CHENARD -- 37 CFR 1.131

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

I, JEAN-YVES CHENARD, do hereby declare that:

1. I am the Jean-Yves Chenard who is an applicant in the above-identified application.
2. Together with Jean-Claude Mendelsohn, I conceived and reduced to practice the broad idea of the generic invention described in French Patent Application No. 78 24863, filed August 29, 1978, whose priority is claimed in the above-identified application.
3. The generic invention of our conception is contained in the claims of our French Patent Application; an English translation of those claims is attached.
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7. Our conception of the scope of our invention included the obvious and well-known halogen-substituted organotin stabilizers; the work done on our behalf by Michel Foure confirmed that our invention was indeed effective when the organotin compound contains halogen.
8. Jean-Claude Mendelsohn and I were fully aware of the work conducted by Michel Foure in the United States in connection with the combination of halogen-containing organotin compounds and mercaptoesters; this work was done in close consultation with us and represents an embodiment of our invention as described in French Patent Application 78 24863 and described and claimed in the above-identified application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section



1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

26/07/84

Date

JY Chenard

Jean-Yves Chenard

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Applicant: JEAN-YVES CHENARD ET AL : Group 153

Serial No.: 254,313 : Examiner:  
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Filed: April 15, 1981 :

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OF VINYL HALIDE POLYMERS

DECLARATION OF PHILIP E. RAKITA -- 37 CFR 1.132

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

I, Philip E. Rakita, do hereby declare as follows:

1. I hold a Bachelor of Science degree in Chemistry from the Case Institute of Technology, Cleveland Ohio (1966) and a Ph.D. in Organometallic Chemistry from the Massachusetts Institute of Technology, Cambridge, Massachusetts (1970).
2. I was an Assistant Professor of Chemistry at the University of North Carolina, Chapel Hill, North Carolina for five years, during which time I directed a research group in the area of organometallic chemistry; I am currently employed by M&T Chemicals Inc. and have seven years of industrial experience in the field of organotin compounds for stabilization of PVC; I am an author of twenty-three articles in the field of organometallic chemistry; I am familiar with the literature and state of the art related to the use of organotin compounds to stabilize PVC.

3. I have read French Patent No. 2,434,835 of Chenard et al and it is my opinion that a chemist familiar with the use of organotin compounds as PVC stabilizers would know, first, that the mercaptoesters could be used in conjunction with a large number of organotin PVC stabilizers to improve the performance of the stabilizer, and second, that the well-known halogen-containing organotin stabilizers are among the compounds with which the mercaptoesters can be used.
4. I have read the Declaration of Michel Foure dated December 19, 1983 and it is my opinion that the experimental work described in that Declaration confirms the proposition that the mercaptoesters can be used to improve the stabilizing performance of halogen-containing organotin compounds.
5. It is further my opinion that any chemist familiar with the art of PVC stabilization who was acquainted with Chenard et al French Patent No. 2,434,835 and the experimental work described in the Declaration of Michel Foure would know that the halogen-containing organotin compounds were a useful sub-class falling within the class of organotin compounds with which the mercaptoesters described by Chenard et al could be used.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section

1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

19 July 1984  
Date

Philip E. Rakita  
Philip H. Rakita

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Applicant: JEAN-YVES CHENARD ET AL : Group 153

Serial No.: 254,313 : Examiner:  
V. Hoke

Filed: April 15, 1981 :

For: IMPROVEMENT IN THE STABILIZATION  
OF VINYL HALIDE POLYMERS

DECLARATION OF WILLIAM A. LARKIN -- 37 CFR 1.132

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

I, William A. Larkin, do hereby declare as follows:

1. I hold a Bachelor of Science degree from Boston College, Newton, Massachusetts.
2. I am employed by M&T Chemicals and have worked in the field of organotin chemistry for PVC stabilization continuously for the past 22 years in a variety of capacities at M&T Chemicals Inc., including Director of Product Development and Technical Services. My experience in organotin stabilizers includes sales, product management, technical service, product development, product applications, marketing and research. I have developed many new and useful organotin stabilizers for PVC. I have been awarded 106 patents worldwide, 76 of which are for the processing of organotin compounds and compositions, organotin stabilizers for PVC, and PVC compositions useful in the manufacture of bottles, film, pipe and house siding.

3. I am familiar with the literature and patents as they relate to organotin and organotin stabilizers.
4. I have read French Patent No. 2,434,835 of Chenard et al and it is my opinion that a chemist familiar with the use of organotin compounds as PVC stabilizers would know, first, that the mercaptoesters could be used in conjunction with a large number of organotin PVC stabilizers to improve the performance of the stabilizer, and second, that the well-known halogen-containing organotin stabilizers are among the compounds with which the mercaptoesters can be used.
5. I have read the Declaration of Michel Foure dated December 19, 1983 and it is my opinion that the experimental work described in that Declaration confirms the proposition that the mercaptoesters can be used to improve the stabilizing performance of halogen-containing organotin compounds.
6. It is further my opinion that any chemist familiar with the art of PVC stabilization who was acquainted with Chenard et al French Patent No. 2,434,835 and the experimental work described in the Declaration of Michel Foure would know that the halogen-containing organotin compounds were a useful sub-class falling within the class of organotin compounds with which the mercaptoesters described by Chenard et al could be used.

I her by declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true ; and

further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

July 20, 1984  
Date

William A. Larkin  
William A. Larkin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Applicant: JEAN-YVES CHENARD ET AL : Group 153

Serial No.: 254,313 : Examiner:  
V. Hoke

Filed: April 15, 1981 :

For: IMPROVEMENT IN THE STABILIZATION  
OF VINYL HALIDE POLYMERS

SUPPLEMENTAL DECLARATION OF M. FOURE -- 37 CFR 1.131

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

I, MICHEL FOURE, do hereby declare that:

1. I am a Doctor Rerum Natur in Chemistry; this degree was conferred on me by the State University of Wurzburg (West Germany) in 1975; I did post-doctorate research in chemistry at the University of Osaka (Japan) from 1975-1977.
2. I was employed at the Lacq, France, Research Centre of Societe Nationale Elf Aquitaine from 1977 to 1980, doing research in cosmetics and fragrances, lubricants, process development, organotin biocides and polyvinyl chloride stabilizers; in 1980 I became employed by M&T Chemicals Inc., at Rahway, New Jersey, as a Research Associate in the Polyvinyl Chloride (PVC) Additives Group; in 1981 I was promoted to the position of Manager, PVC Additives Group; I hold five patents in the field of stabilization of PVC; I am familiar with the literature and state of the art related to the stabilization of PVC.



3. I am intimately familiar with the invention of Chenard, et al relating to the use of certain mercaptoesters in conjunction with an organotin stabilizer to stabilize polyvinyl chloride with respect to heat.
4. My Affidavit under 37 CFR 1.131, signed on December 19, 1983 is hereby incorporated by reference.
5. It was my opinion, when I first read the Chenard et al, French Patent No. 2,434,835 that a reasonably skilled chemist familiar with the art and literature related to stabilization of PVC would know that a variety of organotin compounds in addition to the compounds specifically named could successfully be used in combination with the described mercaptoesters; I continue to be of that opinion.
6. It was my belief that halogen-containing organotin compounds could successfully be used in combination with the described mercaptoesters; my opinion in this respect was based on my familiarity with the work of Chenard et al and with the prior art, which includes patents such as:

Molt.....	U.S. Patent.....	3,970,678
Wowk.....	U.S. Patent.....	3,758,537
Wowk.....	U.S. Patent.....	3,758,536
Wowk.....	U.S. Patent.....	3,758,341
Larkin.....	U.S. Patent.....	3,715,333
Wowk.....	U.S. Patent.....	3,665,025
Wowk.....	U.S. Patent.....	3,655,613
Kugele.....	U.S. Patent.....	4,118,371
Kugele.....	U.S. Patent.....	4,062,881
Kugel .....	U.S. Patent.....	3,979,359
Bakassian.....	U.S. Patent.....	3,943,099
Brecker.....	U.S. Patent.....	3,630,992
Albright & Wilson..	British Patent..	1,117,652

7. My belief that halogenated organotin compounds could be used in combination with mercaptoesters to obtain improved performance was confirmed by the experimental work described in my Affidavit of December 19, 1983, and it was clear, prior to December 12, 1980, that halogen-containing organotin compounds, in combination with mercaptoesters, gave improved results in respect of stabilization of PVC and that halogen-containing organotin compounds which were themselves known to be useful PVC stabilizers, could be used in combination with the mercaptoesters to stabilize PVC.

7-13-1984

Date



Michel Foure

Sworn to and subscribed before me on the date  
aforesaid by Michel Foure.



Barbara Wheaton  
Notary Public

BARBARA WHEATON  
NOTARY PUBLIC OF NEW JERSEY  
My Commission Expires March 28, 1987